

TRYPARGILUM TRIDENTATUM (PACKARD) IN TRAP NESTS IN OREGON (HYMENOPTERA: SPHECIDAE: TRYPOXYLINAE)

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Trypargilum tridentatum (Packard), found from Connecticut to Florida and west to British Columbia and California, is a member of the *nitidum* species group which preys exclusively on web-building spiders (Krombein et al., 1979). *T. tridentatum* has been found to nest in old borings in wood, elderberry (*Sambucus*) stems, trap nests, and old *Sceliphron* (Sphecidae) nests (Rau and Rau, 1918; Blackman and Stage, 1924; Krombein, 1967; Krombein et al., 1979). According to Krombein (1967), *T. tridentatum* usually provisioned cells with two to four species of spiders per cell in Arizona and North Carolina. The prey within a single trap nest often consisted of two or three spider families. Published prey records include members of the families Theridiidae (4 spp.), Mimetidae (1 sp.), Araneidae (9 spp.), and Dictynidae (1 sp.) (Krombein, 1967), but no nesting data is available for populations from the northwestern United States.

The study area was located about 30 miles south of Burns, Harney Co., Oregon at the Malheur Field Station. Rabbitbrush (*Chrysothamnus* sp.) and Sagebrush (*Artimesia* sp.) was the dominant vegetation in the area.

Trap nests were similar to those used by Krombein (1967); 2.6 × 2.6 × 18 cm blocks of white pine with 6 and 10 mm borings 14 cm deep, and were placed horizontally on a building 1.5 m above the ground during the first week of July 1979. Four completed nests were retrieved on July 20, and sent by mail to Syracuse, New York, where they were split open and the contents removed, examined, and identified. Nests were taped back together after measurements were taken and placed in an outdoor insectary for overwintering. They were retrieved in March 1980, and cocoons along with parasites were transferred to gelatine capsules and coded with cell numbers. These were kept inside until the adults eclosed.

Four trap nests (J-5, 6, 20, 21) contained a total of 31 cells. All nests had been fully provisioned and closed. Mud cell partitions were approximately 1 mm thick, with closing plugs 2.0, 2.1, and 3.5 mm thick. Three nests contained vestibular cells: J-21, two, 2.3 and 2.5 cm long; J-20, 1.0 cm long; and J-5, 1.1 cm long. Dimensions for the nests and the number of prey are given in Table 1.

Mean cell length (both sexes) was $1.38 \pm .312$ cm (N = 31, 1.1-2.7). Male

Table 1. Nest data of *Trypargilum tridentatum* from Oregon.

Nest J-5	Cell	1	2	3	4	5	6	7	8	
Cell length (cm)		1.6	1.3	1.5	1.35	1.6	1.25	1.1	1.1	
Cocoon length		—	—	1.05	—	1.05	P ^a	P	P	
No. of prey		8	7	11	10	12	8	7	7	
Sex		—	—	♀	—	♀	—	—	—	
Nest J-6		1	2	3	4	5	6	7	8	9
Cell length		1.3	1.8	1.6	1.4	1.6	1.6	1.4	1.5	1.1
Cocoon length		1.1	1.3	1.3	1.15	1.2	1.0	—	—	—
No. of prey		—	—	—	—	—	—	7	11	7
Sex		♂	♂	♀	♀	♀	♂	—	—	—
Nest J-20		1	2	3	4	5	6	7	8	9
Cell length		1.25	1.3	1.1	1.2	1.2	1.1	1.5	1.2	1.2
Cocoon length		1.1	1.2	1.05	1.1	—	—	—	—	—
No. of prey		—	—	—	—	9	8	7	8	8
Sex		—	♀	♂	♂	—	—	—	—	—
Nest J-21 ^b		1	2	3	4	5				
Cell length		1.4	1.1	1.2	1.2	2.7				
No. of prey		7	8	10	12	10				

^a Parasitized cells are designated with a "P."

^b All cell contents were removed and preserved in alcohol.

cocoons ranged from 1.0–1.3 cm ($\bar{x} = 1.11 \pm .114$, $N = 5$), whereas female cocoons ranged from 1.05–1.3 cm long ($\bar{x} = 1.15 \pm .097$, $N = 6$). Male cells varied from 1.1–1.8 cm long ($\bar{x} = 1.4 \pm .292$, $N = 5$), and female cell lengths ranged from 1.3–1.6 cm ($\bar{x} = 1.5 \pm .126$, $N = 6$). Krombein (1967) reported populations in Arizona and North Carolina having male cocoons and cells slightly longer and less variable than those of females.

Whereas the wasps in Arizona and North Carolina studied by Krombein (1967) used several genera and families of spiders per nest, I found that *Metepeira grandiosa* Chamberlin and Ivie (Araneidae), a new prey record, was used exclusively in the 21 cells that still contained prey. The mean number of spiders per cell was 8.7 ± 1.7 (7–12). The use of only one species of spider may reflect a local abundance of prey, or conditioning on the part of the provisioning female.

Adult wasps emerged between May 21 and 30, 1980. Three cells in nest J-5 had been parasitized by miltogrammine flies (Sarcophagidae) (Table 1). Cell 6 contained one puparium, cells 7 and 8 each contained three. Unfor-

tunately, no adult flies were reared, but other workers (Parker and Bohart, 1966; Krombein, 1967) have recorded *Amobia floridensis* (Townsend) from nests of *T. tridentatum*.

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Literature Cited

- Blackman, M. W., and H. H. Stage. 1924. On the succession of insects living in the bark and wood of dying, dead, and decaying hickory. N.Y. State Coll. For. Tech. Publ., 17:196-197.
- Krombein, K. V. 1967. Trap-nesting wasps and bees: Life histories, nests, and associates. Smithsonian Press, Washington, D.C., 570 pp.
- . 1979. Superfamily Sphecoidea. Pp. 1573-1740, *In*: Krombein, K. V., P. D. Hurd, Jr., D. R. Smith, and B. D. Burks, Catalog of Hymenoptera in America north of Mexico. Vol. 2, Apocrita (Aculeata). Smithsonian Institution Press, Washington, D.C., pp. i-xvi, 1199-2209.
- Parker, F. D., and R. M. Bohart. 1966. Host-parasite associations in some twig-nesting Hymenoptera from Western North America. *Pan-Pac. Entomol.*, 42:91-98.
- Rau, P., and N. Rau. 1918. Wasp studies afield. Princeton University Press, Princeton, 372 pp.